



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------|------------------|
| 09/873,264 | 06/05/2001 | Toru Uchida | 010726 | 6047 |
| 38834 | 7590 | 10/05/2004 | EXAMINER | |
| WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036 | | | BAUMEISTER, BRADLEY W | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2815 | |

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/873,264

Applicant(s)

UCHIDA ET AL.

Examiner

B. William Baumeister

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-36 is/are rejected.
- 7) ☒ Claim(s) 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification/Drawings

1. The disclosure is objected to because of the following informalities:
 - a. Page 4, lines 24-32: This portion of the specification discusses prior-art depicted in Fig 2. The specification discusses strained InGaP compositions, while Fig 2 previously set forth that the compositions are InGaAs. Applicant amended the drawings so that both now set forth InGaP. However, both should set forth InGaAs.

Appropriate correction to these and any other minor discrepancies of which Applicant becomes aware is required.

Claim Rejections - 35 USC § 102 and § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 21-36 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Svilans '200.
 - a. Svilans discloses photodetectors with an active layer having alternating compressive-strained and tensile strained InGaAs layers arranged so that the total effective strain of the active region is balanced and capable of operating in a wide wavelength range, covering a wide range of temperatures (e.g., ABSTRACT). The wavelength range includes 1620 nm (col. 3, lines 5-11) and operating temperatures including -40 C (e.g., col. 3, lines 39-42 and col. 8, lines 43-46).

Note, for example, the embodiment of FIGs 1 and 2 wherein the active layer 16 comprises 15 cycles (col 4, lines 45-) of 80-nm, 0.25%-compressive-strained In._{0.57}Ga._{0.43}As layers and 20 nm, 1.03%-tensile-strained In._{0.385}Ga._{0.615}As layers formed on an n-doped InP substrate 12 (col. 4, line 44). The strains and thicknesses satisfy the equation now incorporated into claim 1 from canceled claim 4. Further, Applicant's Fig. 6 and associated discussion at page 14 of the present application evidence that this embodiment of Sivilans will inherently achieve an optical absorption efficiency of at least 50% (about 53%) when an optical radiation having a wavelength of 1620 nm comes in at a temperature of -40C.

b. Regarding claims 11 and 13-15, FIGs 7a-c depict the associated discussion set forth at col. 8 relating to the optional use of step-grading or continuous grading layers between the first and second layers.

c. Applicant has previously amended claim 1 to recite that the first semiconductor layer has a strain magnitude *exceeding* 0.25%, in order to distinguish over Sivilans' specific example of 0.25%, itself. Similarly, previously added claim 18 recites that the thickness of the first and second layers is *less than* 1.5 μ m, to distinguish over Sivilans' specific example of 1.5 μ m; and claims 19 and 20 respectively recite that the thickness of the first layer is *less than* or *greater than* 80 nm, as opposed to being equal to 80 nm, itself. Restated, Applicant's claims respectively set forth strain and thickness ranges that have endpoints which are intended to approach very closely, but expressly exclude, the specific strain and thickness values set forth in the Sivilans example. Since the legal precedence is unclear as to whether, under this fact pattern, Sivilans constitutes a 102

Art Unit: 2815

anticipation of the claims or alternatively renders the claim obvious under 35 USC 103 (see e.g. *Ex Parte Lee*, 31 USPQ2d 1105 (BdPatApp&Int, 1993), the rejection is set out in the alternative for the reasons appearing below:

- i. The claims are rejected as anticipated under the theory that because the open-ended endpoints of claimed ranges may approach infinitely close to the strain and thickness values of Svilans, the claims effectively still recite a structure that reads on the example of Svilans--or at least within any chosen minimal design tolerance thereof.
- ii. The claims are alternatively rejected as obvious under the theory that even if not constituting an overlapping range, the claims' ranges are close enough to the values taught by Svilans that one skilled in the art would have expected them to have the same properties. *See, In re Peterson*, 65 USPQ2d 1379, 1382 (CAFC 2003), *citing Titanium Metals Corp. V. Banner*, 227 USPQ 773, 779 (Fed. Cir, 1985). This closeness and expectation of same properties is evidenced, for example, by the fact that claims 19 and 20 approach Svilans' recited 80-nm thickness from both below and above, respectively.

d. Applicant has presently amended to the claims to recite that the strained layers' thicknesses satisfy the relationship $L_w = A * \epsilon W + L$. However, these claims do not include any constants for either ϵW or L . As such this claimed relationship, while relevant to the underlying theory, does not structurally limit the claims, nor distinguish the present invention from Svilans. Claim 36 does further recite that $L = 1.3 \text{ um}$. But since no constant is included for ϵW , the claim still reads on Svilans

because a discrete value for the negative constant ϵW could be calculated that would read on the structure of Sivilans.

- i. Applicant is again reminded that it is well-settled law that the discovery of the theory by which a prior-art device operates is not patentable. Rather, while a device which incorporates a novel theory may be patentable, such a device must still be novel and unobvious from prior-art devices. Also, the discovery of a new property or use of a previously known composition, even when that property and use are unobvious from the prior art, can not impart patentability to claims to the known composition. *In re Spada* (CAFC) 15 USPQ2d 1655, 1657 (1990) (internal citations omitted).

Allowable Subject Matter

4. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. The following is a statement of reasons for the indication of allowable subject matter: a search of the prior art failed to disclose or reasonably suggest a photodetector having a compressive/tensile strained superlattice wherein the respective layer thicknesses satisfy the equation of claim 37 including the discrete values set forth for L (claim 36) and ϵW (claim 37).

Art Unit: 2815

Response to Arguments

6. Applicant's arguments filed 9/2/04 have been fully considered but they are not fully persuasive for the reasons set forth hereinabove.

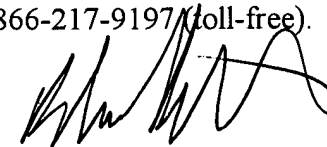
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. William Baumeister whose telephone number is (571) 272-1722. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**THOMAS BAUMEISTER
PRIMARY EXAMINER**



B. William Baumeister
Primary Examiner
Art Unit 2815

September 30, 2004